CLAIMS

What is claimed is:

1. An adaptive dynamic wavefront sensor comprising:

a spatial light modulator; and

a lenslet array.

2. The sensor of claim 1 wherein a sub-array of pixels of said spatial light modulator controls illumination of a lenslet of said lenslet array.

3. The sensor of claim 2 wherein said sub-array operates as a shutter for said lenslet.

4. The sensor of claim 3 wherein said spatial light modulator selectively illuminates a subset of all lenslets of said lenslet array.

5. The sensor of claim 4 wherein dynamic range of said sensor is increased by allowing each lenslet focus to occupy a larger area of a detection device.

6. The sensor of claim 4 wherein said sensor samples a wavefront at a variable density of points and frequencies to adaptively determine an optimal scan rate and scan configurations.

7. The sensor of claim 4 wherein said sensor adaptively changes temporal frequency to quantify vibration amplitudes and modes.

8. The sensor of claim 2 wherein said sub-array operates to control intensity of a focus of said lenslet.

9. The sensor of claim 8 wherein said sub-array operates to perform one or more tasks selected from the group consisting of improving signal-to-noise ratio and changing an effective f-number of said lenslet.

10. The sensor of claim 8 wherein said sub-array operates to apodize illumination of said lenslet to control aberration content of a beam from said lenslet.

11. An adaptive dynamic wavefront sensor comprising:

a polarizer;

pupil relay lenses;

a spatial light modulator;

a lenslet array;

a CCD camera receiving light from said lenslet array; and

a polarizing beam splitter receiving incoming light from said polarizer on one side and from said spatial light modulator on another side and sending light to said spatial light modulator on one side and to said lenslet array through said pupil relay lenses on another side.

12. An adaptive dynamic wavefront sensing method comprising the steps of:

receiving light and outputting light with a spatial light modulator; and

providing light output from the spatial light modulator to a lenslet array.

13. The method of claim 12 wherein in the receiving and outputting step a sub-array of pixels of the spatial light modulator controls illumination of a lenslet of the lenslet array.

14. The method of claim 13 wherein in the receiving and outputting step the sub-array operates as a shutter for the lenslet.

15. The method of claim 14 wherein in the receiving and outputting step the spatial light modulator selectively illuminates a subset of all lenslets of the lenslet array.

16. The method of claim 15 additionally comprising the step of increasing dynamic range by allowing each lenslet focus to occupy a larger area of a detection device.

17. The method of claim 15 additionally comprising the step of sampling a wavefront at a variable density of points and frequencies to adaptively determine an optimal scan rate and scan configurations.

18. The method of claim 15 additionally comprising the step of adaptively changing temporal frequency to quantify vibration amplitudes and modes.

19. The method of claim 13 wherein in the receiving and outputting step the sub-array operates to control intensity of a focus of the lenslet.

20. The method of claim 19 wherein in the receiving and outputting step the sub-array operates to perform one or more steps selected from the group consisting of improving signal-to-noise ratio and changing an effective f-number of the lenslet.

21. The method of claim 19 wherein in the receiving and outputting step the sub-array operates to apodize illumination of the lenslet to control aberration content of a beam from the lenslet.

22. An adaptive dynamic wavefront sensing method comprising the steps of:

passing light through a polarizer;

with a polarizing beam splitter, receiving incoming light from the polarizer on one side and from a spatial light modulator on another side and sending light to the spatial light modulator on one side and to a lenslet array through pupil relay lenses on another side; and

receiving light from the lenslet array with a CCD camera.